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in all these geometries that make us wish sometimes for a fourth dimension and the power of moving into it, but they do not necessarily imply this dimension. The simple principle of congruence fails, for example, if we attempt to apply it directly in proving the equality of two Euclidean pyramids whose corresponding parts are mutually equal but arranged in reverse order. The analogous theorem in plane geometry is proved by obverting one of the triangles in the third dimension. Were there a fourth dimension and had we the power of moving into it, it is conceivable that this might also be done for the pyramids. What would happen is simply this: By obverting one of the pyramids in the fourth dimension and then returning it to its own tri-dimensional world, its relations to the other objects of this world are changed in a way that is wholly impossible so long as we confine it to three dimensions. But the internal relations of the pyramid itself, as in the observed case of the triangle, remain entirely unaltered. The self-identity of the figure is retained. But as we have said, these facts cannot be regarded as implying the logical dependence of Euclid, or of non-Euclid, upon a fourth dimension."

The author sums up his inferences as to the nature of space by recognising that only pure logic is strictly *a priori*, while geometry with its space-conception contains an element of experience the actuality of which can only be proved empirically. We sum up the situation in his own words:

"The only *a priori* manifold at present definable in Kant's sense of *a priori* seems to be a manifold constituted by a totality of logical classes or distinctions of any similar sort. The constitution of such a complete system of logical entities must be implicitly known to any rational being....

"The connection between this *a priori* logical manifold and the empirical space of our own experience lies in the fact that the space-aspect of experience is the one which most definitely implies and is implied by our power to co-ordinate our activities so that "*a leads to b leads to c,*" etc. It is that aspect which enables us to introduce illative relations among acts and systems of acts of our own (acts actual and acts possible).

"*That* this aspect of experience exists is an empirical fact. *What* correlations of acts it permits and *how* it permits them are also empirical. All the details are empirical. But if it is to permit such a system at all, it has to conform to the general type of the illative relation and its parts viewed as coexistent must be related to each other in accordance with the general type of an illative relation."

THE FOURTH DIMENSION. By C. Howard Hinton. London: Swan Sonnenschein & Co. 1904. Pp. vi, 247.

Mr. Howard Hinton, already well known from the publication of his *Scientific Romances*, ably written rambles into the domains of metageometry

and other spheres of the super-sensible world, presents us now with his theory of the fourth dimension that to him is a well-founded fact, to the explanation and evidence of which he has dedicated the whole of this small volume. His procedure may be briefly characterised as forming a systematic conception of four-dimensional space, and then pointing out how a three-dimensional system ought to act if it were a part of a higher or four-dimensional one. Mr. Hinton shows that in investigating the real universe when descending into the finer subdivisions, we come to forms of matter possessing properties different from those of larger masses; and analogous conditions prevail when we take into consideration cosmic relations such as the parallaxes of stars, where the combined angles of triangles cease to measure exactly 180 degrees. Unfortunately the argument is not conclusive in the opinion of those who are not willing to be carried away by mysticism. But even those antagonistic to a belief in the objective actuality of metageometry will find Mr. Hinton's presentation of the subject refreshing and ingenious. How much room a romance of science can find in the mysterious realm of the fourth dimension!

TUTONISH. A Teutonic International Language. By *Elias Molee*, Ph. B.

Published by the author. Tacoma, Wash. 1904. Pp. 96. Price, \$0.40.

Among the enthusiasts who propose the creation of a new language, Elias Molee of Tacoma, Wash., takes an intermediate course by offering not a universal language, but a speech that should be acceptable to the Germanic race. Living in a community which is mostly made up of Teutonic people, he tried to establish a tongue that could serve as a means of communication between the English, the Germans, the Swedes, the Norwegians, the Danes, the Dutch, and the Icelanders. He calls this new language "Tutonish" and trusts that it will prove superior to the English. It is constructed after the analogy, of German and English and retains much of the grammar common to all Teutonic languages. As an instance may serve the Lord's Prayer which in Tutonish reads as follows:

"vio fadr hu bi in hevn; holiirn (hallowed) bi dauo (thy) nam; dauo reik (kingdom) kom; dauo vil bi dun an erd, as it bi in hevn; giv vi dis dag vio dagli bred, and fergiv vi vio shuld (debt), as vi fergiv vio shulders (debtors), and lied vi not into fersieku (temptation), but befrie vi from ievl, fyr dauo bi du reik, du makt (power) and du herlinu (glory) fyr ever—amen.
(from mataeus 6, 9-13.)"

Matthew ii. in Tutonish begins as follows:

"nau ven jesus bin birtn in bethlehem ov judea in di dags ov herod, do king, sie, dar komen veis mans from du ost tu jerusalem. sagend, ver bi hi hu bi birtn king ov di judars? fyr vi hav sien hio star in du ost, and hav komen tu anbied hi."